APPENDIX A Fire Protection Guidelines for Wildland Residential Interface Development

What Is the Wildland / Urban Interface Fire Problem?

Population Growth and Expansion

Over the past century, America's population has nearly tripled, with much of the growth flowing into traditionally natural areas. Residential development has entered remote agricultural and forest wildland areas. This movement has created an extremely complex landscape that has come to be known as the wildland-urban interface. Encroaching development into forests, grasslands, and farms has resulted in numerous problems, including catastrophic wildfires, which increasingly threaten lives, homes and businesses.

Wildfires have historically occurred in forested or other wildland areas. Threats to life and property from wildfires and costs for suppressing them are expanding at an astounding rate. In 1973, 1.9 million areas of private, state and federal lands burned from wildfires. In 1996, with increased expansion into the wildland/urban interface, almost 6.7 million acres were consumed by wildfires. Taxpayer costs exceeded $689 million, not including property loss estimates.

Who is Responsible for Wildland /Interface Fire Mitigation?

Traditionally communities have viewed firefighters as "protectors" and homeowners as "victims" of wildland fire. This paradigm is now shifting from "protector-victim" to "partner-partner." Everyone associated with the wildland/urban interface should be prepared for the effects of wildland fires before the fire even starts. Responsibility for management, preservation, restoration, and mitigation rests with everyone in the community. This responsibility does not imply stopping wildland fires, nor does it mean preventing people from living in wildland/urban interface areas. Instead, a stewardship between homeowners and firefighters, as a combined effort, is recognized as necessary to minimize costly destruction and preserve lifestyles through smart and effective community-wide efforts.

What does Current Wildland/Interface Fire Research Tell Us?

- In the case of wildland fires, the more new development occurring in highly flammable and hazardous vegetative fuels, the more serious potential for loss of life and property.

- Adequate survivable space clearance and noncombustible building materials are crucial factors in the protection of homes from wildland fire.

- With appropriate space clearance (defensible space) and modified roofing materials, wildfire hazard risks can be effectively reduced by 50 percent.

Fire Mitigation Strategies for Homes in Wildland /Urban Interface Areas

Create Defensible Space

A defensible space refers to an area around the home where native vegetation has been modified to reduce the fire threat to the structure and to provide a safe area for firefighters to work effectively and safely.

The benefits to **defensible space include**:

- The fire fighters can safely and more successfully defend the home.
- The home is more likely to survive a wildland/urban interface fire without structure protection.
- If native vegetation is properly vegetation is properly modified, a wildland fire can be slowed down, the lengths of flames shortened, and the amount of heat reduced, all of which contribute to a home surviving a wildland fire.

How Does a Homeowner Create A Defensible Space?

- Slope affects the size of defensible space. Homes near steep slopes will need to clear additional vegetation to mitigate the effects of radiant and convective heat currents and flame lengths. The downward distance is particularly important because sloops will increase flame length.
- Determine the amount of defensible space necessary. Keep in mind property boundaries and ownership of adjacent properties. Consider impact of percent slope, uphill, sides and downhill.
- Evaluate the area surrounding your home in terms of defensible space and identify problem areas for correction. Develop a plan for correcting the problems, coordinate with adjacent landowners if necessary, and incorporate existing formal landscape features.

Landscape Modifications for Effective Wildland/Urban Interface Fire Mitigation

- Zone A: The area within five feet of the home. The primary purpose of this zone is to have the least flammable types of landscaping material immediately adjacent to the structure to prevent ignition from firebrands and direct flame contact. Suggested planting material includes: low growing shrubs and other vegetation with high moisture content such as lawn, annual and perennial flowers and ground covers. Supplemental irrigation is especially important to keep plants green in this area.
- Zone B: Area between five feet and 30 plus feet from the home. This zone provides the critical area for firefighting efforts. Fuel reduction is important here in terms of reduced volume and density. All dead plant material should be removed including not only entire trees but also dead tree branches. Trees and shrubs native to the location are acceptable, i.e. conifers, if a 10 to 15 foot spacing exists between groupings and if there is adequate separation between the crowns

of adjacent trees. Branches pruned so that the lowest limbs are at least 6 to 19 feet from the ground is an effective fuel reduction goal as well as the elimination of any ladder fuels. All slash should be disposed of and removed.

- Zone C: Represents the remainder of property. Effective fuel reductions in this area include selective pruning and thinning trees and limiting dead trees (snags) to two per acre. It is also important to make sure these snags cannot fall onto the home or block access roads or driveways.

Fire Resistant Vegetation

- Deciduous trees such as Quaking Aspen, Ash, Alder, Birch, Locust, fruit trees, Russian olive and Cottonwoods.

- Shrubs that are low growing and typically of high moisture content such as Chokeberry, Buffalo berry, Dogwood, Rose, Sumac, Plum, and Cherry.

- Groundcover plants such as annual and perennial flowers, herbs, mulch, and decorative rocks and gravel.

General Firewise Landscaping Tips

1. High moisture content is the single most important variable in the determination of plant flammability.

2. Deciduous plants tend to be more fire resistant because their leaves have higher moisture content and their basic chemistry is less flammable. Conifers tend to be more flammable due to their oil and pitch content, regardless of their water content.

3. Spacing and design maintenance is very important in efforts to create defensible space. Where and how you plant, as well an adequate maintenance over time, may be more important than what you plant.

4. Proper thinning and pruning of existing coniferous plants is an effective method to reduce wildfire hazards. When choosing conifers for your defensible space, try to select those with characteristics that allow them to have a better chance to survive fire such as thick bark, long needles, and self-pruning.

5. Landscape designs which arrange planting beds in small irregular clusters vs. large beds, break up continuity of the vegetation (decorative rock, gravel. or stepping stone pathways). Incorporate a variety of plant types and species.

Structural Design and Materials for Mitigation

Roof Materials to Reduce Fire Hazards

The roof is the most vulnerable feature of a structure to a wildland/urban interface fire. Wildfire can produce exceptionally strong winds that can carry partials up to a mile from

the fire. These airborne firebrands landing on a roof can ignite the building and threaten other structures. **Roofing material is more critical than roof construction.** Replacing untreated wood or shingles with a fire rated Class A or B materials are the only long-term solution to reducing wildland fire threat to a structure. Table A lists the roof material classifications.

TABLE A

Fire Ratings of Roofing Materials:

Class A **fire rated roofing materials includes slate; rock shingle; concrete tile; and fiberglass based asphalt shingle and rolled roofing.**

Class B **fire rated roofing materials includes aluminum shingle; aluminum or steel panels; and periodically treated wood shingle or shake, plus heat barrier.**

Class C **fire rated roofing materials includes felt-tar based asphalt or rolled roofing; asphalt tar gravel; and periodically treated wood shake and wood shingle.**

Not Rated **roofing material includes untreated wood shingle or shake.**

Also, where practical, construct roofs with a minimum of a four-in-twelve pitch. Vertical roofs are preferable to horizontal roofing, or application of flame-retardants to existing siding and reapplied at least every other year.

Other Construction Materials and Considerations

Siding materials should be non-combustible and able to resist heat and flames. For example: siding of brick, cement, plaster, stucco and concrete masonry.

Exterior vents should be covered with ¼ inch wire mesh.

Chimneys should have a spark arrester.

Windows should be tempered and double paned.

Wooden decks with exposed areas underneath should be enclosed by screens and are free of flammable vegetation and combustible materials.

Attaching Structures such as decks, porches, fences, or sheds should be considered part of the house because these structures can act as fuses or fuel bridges, particularly if constructed out of farmable materials.

Smoke detectors should be installed in the home, at least one near sleeping areas, and should be checked regularly.

Yards should be kept uncluttered, free of trash, and without obvious safety obstacles, keeping in mind the likelihood of poor visibility in nighttime or heavy smoke situations to allow firefighters the safest access to the home.

Lawns should be irrigated and grasses mowed to six or less inches in the area proximal to the house during high wildfire season.

Flammable objects such as propane tanks, gas grills, and woodpiles should be kept out of the immediate area surrounding the house, i.e. within 30 feet.

Community Risk Factors Affecting Wildfire Outcomes

1. Road access (ingress and egress)
   Road width
   Grades
   Type of road surface
   One way or two way dead-end and turn around

2. Bridges and capacity to withstand impacts of necessary firefighting vehicles.

3. Water storage and supply such as adequate water mains, individual water storage areas, and commercial/residential sprinklers.

4. Visibility of power lines.

5. Road signs and addresses that clearly display and are visible from the road.

6. Response time for firefighters to access threatening area.

7. Communication systems for back up, such as satellite phones.

8. A community evacuation plan.

9. Designated safety zones with water source, communication capacity, and appropriate shelter and fire protections for firefighters and residents unable to evacuate.

10. Communications with the appropriate firefighting agencies: including a map of the area, inhabited residences, high density properties, water supplies, specific

modifications to structures, turn around, available equipment for fire fighting on site, fire mitigations, etc.

Bibliography

Firewise Communities, BatterymarchPark, Quincy, Massachusetts, 02269, Second Edition, Second Printing, 2003.

Big Sky Fire Management Strategy, Big Sky, Montana, 2003.

Fire Protection Guidelines for Wildland Residential Interface Development, Montana Department of Justice-Fire Prevention and Investigation Bureau and Montana Department of Natural Recourses and Conservation, 1993.